

Monthly Marine Biotoxin Report

April 2003

Technical Report No. 03-13

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of April 2003. Ranges of toxin concentrations are provided for the paralytic shellfish poisoning (PSP) toxins and for domoic acid (DA). Estimates are also provided for the distribution and relative abundance of *Alexandrium*, the dinoflagellate that produces PSP toxins, and *Pseudo-nitzschia*, the diatom that produces domoic acid. Summary information is also provided for any quarantine or health advisory that was in effect during the reporting period.

Please note the following conventions for the phytoplankton and shellfish biotoxin distribution maps: (i) All estimates for phytoplankton relative abundance are qualitative, based on sampling effort and percent composition; (ii) All toxin data are for mussel samples, unless otherwise noted; (iii) All samples are assayed for PSP toxins; DA analyses are performed as needed (i.e., on the basis of detected blooms of the diatoms that produce DA); (iv) Please refer to the appropriate figure key for an explanation of the symbols used on the maps.

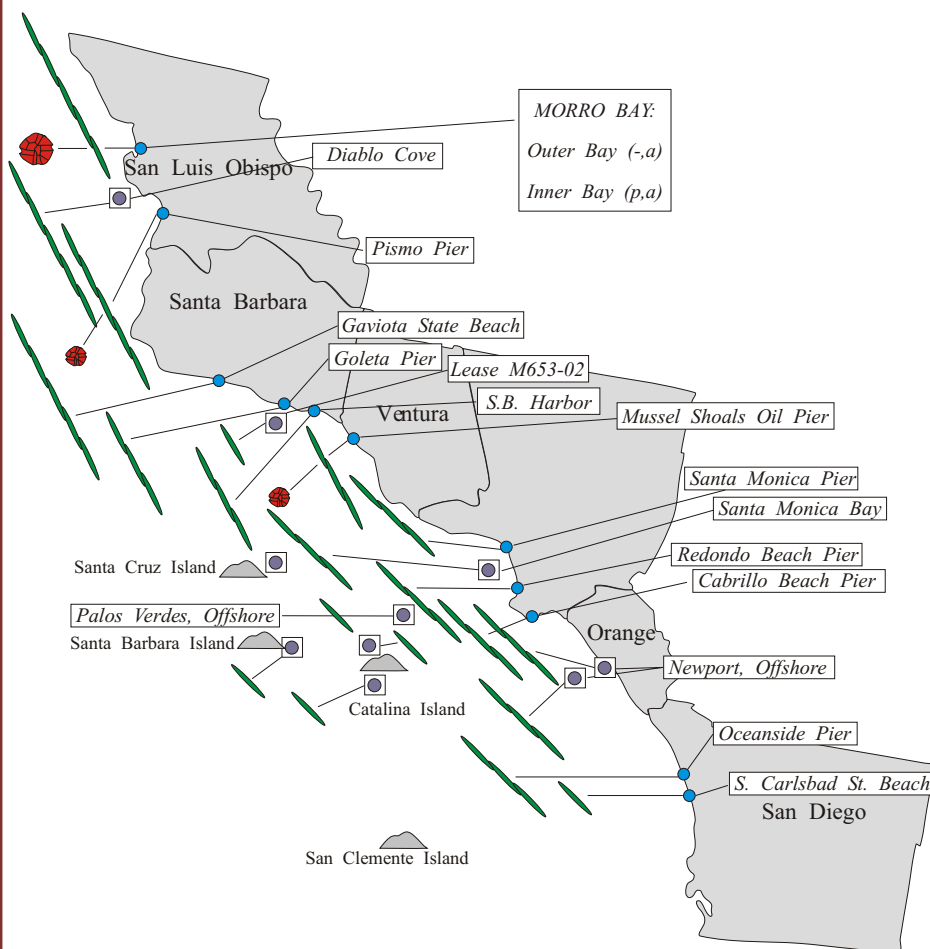
Southern California Summary:

Paralytic Shellfish Poisoning:

Alexandrium was present at several southern California sites during April. This dinoflagellate was first observed at Pismo Pier on April 5,

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Figure 1. Distribution of toxin-producing phytoplankton in Southern California during April, 2003.



Relative Abundance of Known Toxin Producers

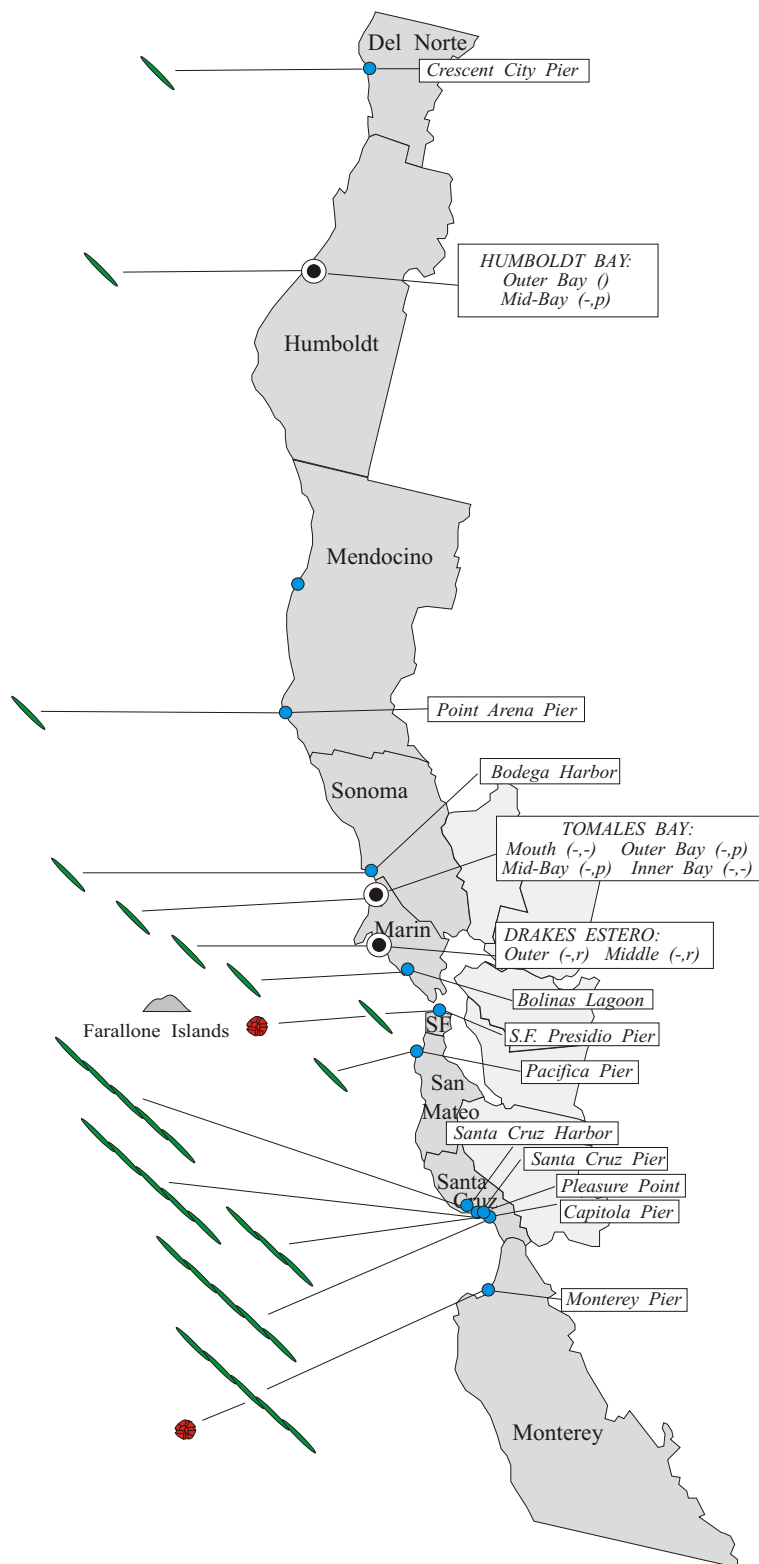
Alexandrium Species		Pseudo-nitzschia Species	
	Rare (less than 1%)		Present (less than 10%)
	Present (between 1% and 10%)		Common (between 10% and 50%)
	Common (between 10% and 50%)		Abundant (greater than 50%)
	Abundant (greater than 50%)		

MONTHLY SAMPLING STATIONS:

- Single Sampling Station
- Multiple Sampling Stations
- Offshore Sampling Station

For areas with multiple sampling stations, species abundance at each station is represented as follows:
(a,p) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.
e.g., (c,p) = common, present; (a,-) = abundant, not observed

Figure 2. Distribution of toxin-producing phytoplankton in Northern California during April, 2003.



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then again on April 21 in northern Ventura County and inside Morro Bay. One week later a low level of PSP toxins (39 ug) was detected in mussels from Morro Bay (Figure 3). PSP toxicity was absent from all other shellfish samples collected at sites along the Southern California coast throughout the month.

Domoic Acid:

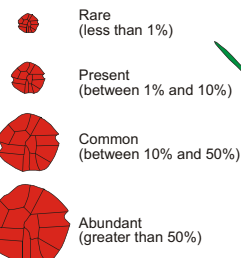
There was a dramatic increase in the distribution and relative abundance of *Pseudo-nitzschia* along the southern California coast during April (Figure 1). The relative abundance and cell number for this diatom was greatest at sites from San Luis Obispo through Los Angeles counties. There appeared to be a northward (up coast) progression over time in the detection of low concentrations of domoic acid in shellfish.

The relative abundance of *Pseudo-nitzschia* increased at sites in Santa Monica Bay (Los Angeles County) by April 10 (Figure 1), with the greatest cell mass observed offshore in samples collected by the City of Los Angeles. Although other diatom species were also present, *Pseudo-nitzschia* was the dominant species in this region. A mussel sample collected on April 10 by the Los Angeles

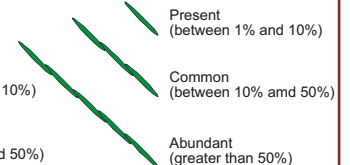
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Relative Abundance of Known Toxin Producers

Alexandrium Species



Pseudo-nitzschia Species



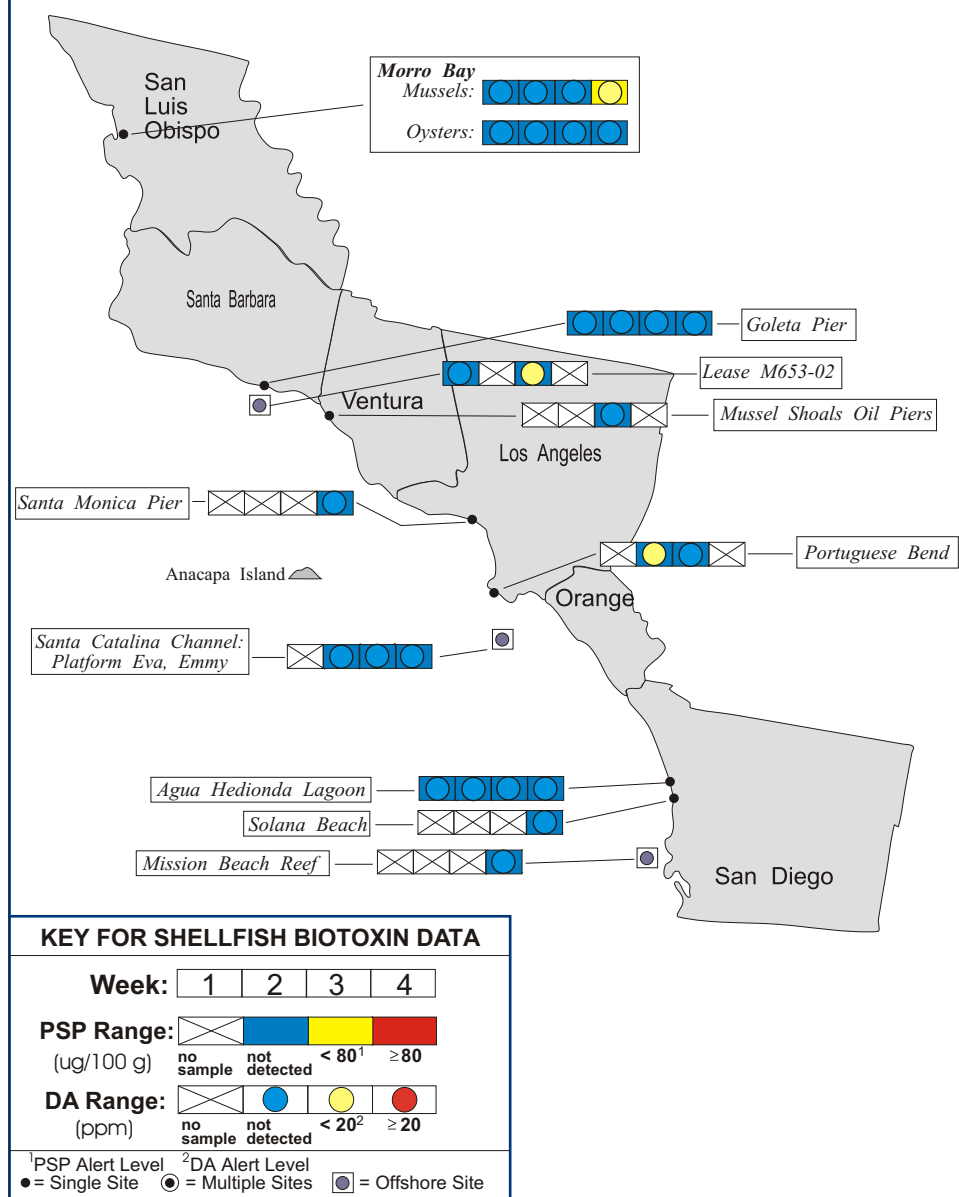
MONTHLY SAMPLING STATIONS:

- Single Sampling Station
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For areas with multiple sampling stations, species abundance at each station is represented as follows:

(A,P) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.
e.g., (c,p) = common, present; (a,-) = abundant, not observed

Figure 3. Distribution of shellfish biotoxins in Southern California during April, 2003.



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County Health Department from Portuguese Bend, just south of Santa Monica Bay, contained 3 ppm of domoic acid (Figure 3). *Pseudo-nitzschia* increased in abundance farther south at nearshore sites (Redondo and Cabrillo piers) by the end of the month.

The highest relative abundance of this diatom along the Santa Barbara coast was

observed at Gaviota Pier. *Pseudo-nitzschia* was also common farther down coast and inside Santa Barbara Harbor through the third week of the month. Unfortunately shellfish samples were not available from the areas with the greatest concentrations of *Pseudo-nitzschia*. Oysters collected from a site approximately one-half mile offshore contained 3 ppm of domoic acid on April 21 (Figure 3).

Frequent sampling by volunteers revealed that *Pseudo-nitzschia* was a dominant component of the phytoplankton throughout most of April along the San Luis Obispo coast as well as inside Morro Bay. This diatom accounted for up to 97% of the species composition at a site offshore of Diablo Cove on April 11. Domoic acid (2 ppm) was detected in a mussel sample collected from inside Morro Bay on April 27 (Figure 3).

Nontoxic Events:

Several nontoxic species of phytoplankton were also prevalent at times through April. The diatoms *Chaetoceros* and *Skeletonema* were common from San Luis Obispo to Los Angeles. As noted in March, Los Angeles seemed to be a transition zone where dinoflagellates occurred in significant numbers. High numbers of *Ceratium furca* were observed along the coast of Los Angeles and Orange counties, particularly towards the end of April.

Northern California Summary:

Paralytic Shellfish Poisoning:

Alexandrium was absent from most sampling sites during April. Low numbers of this dinoflagellate were observed in samples from San Francisco and Monterey (Figure 2).

The low levels of PSP toxins detected in the Drakes Bay region of Marin County in February and March continued throughout April. Low levels of PSP toxins were also detected in mussels collected from San Francisco, San

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Mateo, and Santa Cruz locations.

Domoic Acid:

Pseudo-nitzschia was present along the entire Northern California coastline during April (Figure 2). The high relative abundances of this diatom observed inside Monterey Bay in March continued into April. The relative abundance of this diatom exceeded 95% at sampling sites in Santa Cruz and Monterey. Samples collected inside Santa Cruz Harbor by San Lorenzo Valley High School showed a pattern of peak abundance of *Pseudo-nitzschia* on April 1, decreasing slightly by April 9, then decreasing to very low levels by the end of the month. Researchers from U.C. Santa Cruz reported continued high densities of *Pseudo-nitzschia australis* from March through early April, with densities decreasing by mid-month through the end of April. The highest relative abundance of this diatom in the Monterey area also occurred within the first week of April, decreasing significantly by the end of April.

Elevated concentrations of domoic acid were detected in mussels from the Santa Cruz Pier during April (Figure 4) and represented a further increase from the levels detected in March at this site. A mussel sample collected from Santa Cruz Pier on April 2 contained 80 ppm of domoic acid, well above the federal alert level of 20 ppm. Concentrations of this toxin decreased to 22 ppm on April 9 and to 6 ppm on April 16 at this site, following the trend in declining cell densities reported by U.C. Santa Cruz. Mussels from Sunny Cove in Santa Cruz, collected on April 21, contained 2 ppm of domoic

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Figure 4. Distribution of shellfish biotoxins in Northern California during April, 2003.

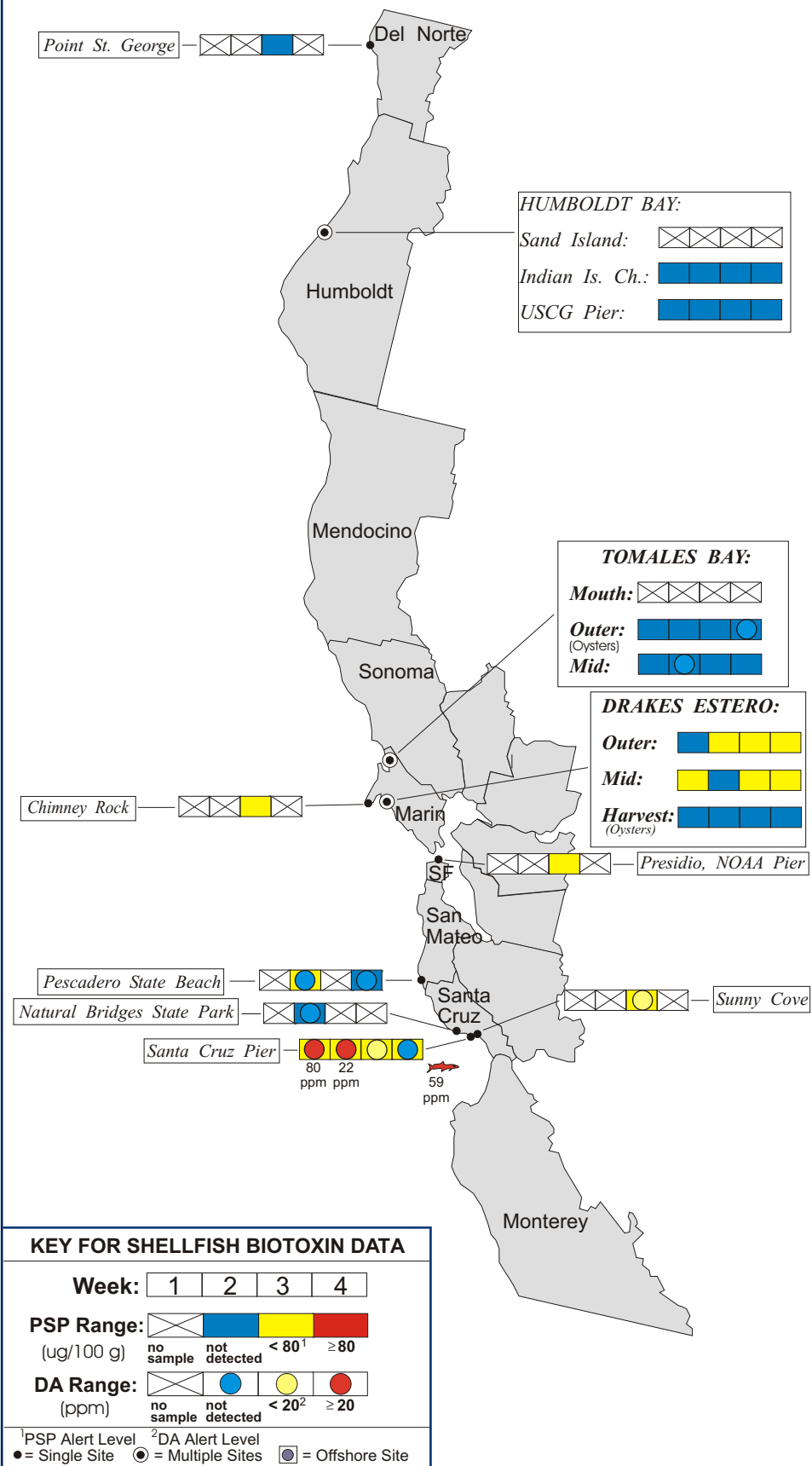


Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during April, 2003.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	1
Humboldt	Coast Seafood Company	10
Mendocino	None Submitted	
Sonoma	None Submitted	
Marin	Cove Mussel Company	4
	Hog Island Oyster Company	3
	Johnson Oyster Company	20
	Marin Oyster Company	4
	CDHS Marine Biotoxin Program	1
San Francisco	San Francisco County Health Department	1
San Mateo	San Mateo County Environmental Health Department	2
Santa Cruz	U.C. Santa Cruz	5
	Santa Cruz County Environmental Health Department	3
Monterey	None Submitted	
San Luis Obispo	Williams Shellfish Company	8
Santa Barbara	U.C. Santa Barbara Marine Science Institute	5
	Santa Barbara Mariculture Company	2
Ventura	Ventura County Environmental Health Department	1
Los Angeles	Los Angeles County Health Department	3
Orange	Ecomar, Inc.	3
San Diego	Carlsbad Aquafarms, Inc.	4
	CDHS Volunteer (Paul Sims, Spence Pickett)	2

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acid. Despite the low levels of domoic acid still present at the Santa Cruz sites by mid-month, mussels from Natural Bridges, located at the outer margin of Monterey Bay, did not contain a detectable level of this toxin. Anchovies collected by the Department's Food and Drug Branch contained high levels of domoic acid (35 - 59 ppm), that were slightly lower than the concentrations found in sardines fished from Monterey Bay in March.

Nontoxic Events:

Diatoms were dominant along the Northern California coastline in April. *Chaetoceros* and *Skeletonema* were common at most locations along the coast. In addition to these species, the diatoms *Coscinodisus* and *Ditylum* were also common at sites along the San Francisco and San Mateo coast. The *Prorocentrum* bloom observed in February and March inside Tomales Bay continued through April in parts of the Bay.



QUARANTINES:

There were no special quarantines or health advisories in place in April 2003.

California implements an annual quarantine each year from May 1 through October 31, which applies only to sport-harvested mussels along the entire California coastline, including all bays and estuaries. Marine Biotoxin Monitoring Program participants collect samples throughout the year. The Annual Quarantine does not affect the commercial shellfish growing areas in California. All commercial shellfish growers certified by the State of California are required to submit routine (at least weekly) samples for biotoxin analysis, allowing us to closely monitor the presence of any toxin. Harvesting closures are imposed if toxin levels reach the federal alert level.

Consumers of Washington clams, also known as butter clams, are cautioned to eat only the white meat. Persons taking any clams or scallops are advised to remove and discard the dark parts (i.e., the digestive organs or viscera). Only the white meat of clams and scallops should be prepared for human consumption.

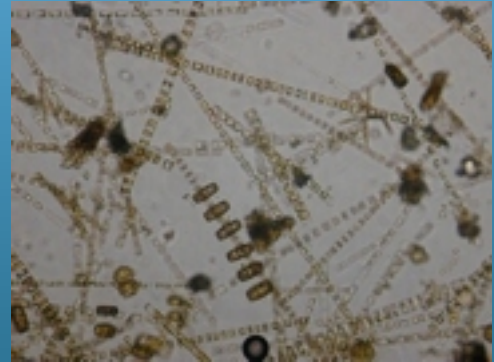
We recommend that persons engaged in the sport-harvesting of any bivalve shellfish (e.g., mussels, clams, scallops) contact the Department's "Shellfish Information Line" at 1-800-553-4133 or (510) 412-4643 for a current update on marine biotoxin activity.



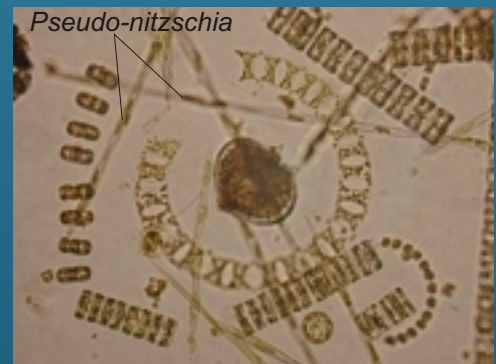
Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during April, 2003.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	1
Humboldt	Coast Seafood Company	5
Mendocino	CDHS Volunteer (Amy Johnson, Jim Wesley)	2
Sonoma	Bodega Marine Laboratory	2
Marin	California Department of Fish and Game	2
	CDHS Volunteer (Brent Anderson, Cal Strobel)	4
	Johnson Oyster Company	16
Alameda	None Submitted	
San Francisco	CDHS Volunteer (Eugenia McNaughton)	3
San Mateo	San Mateo County Environmental Health Department	2
Santa Cruz	Santa Cruz County Environmental Health Department	4
	San Lorenzo Valley High School	4
Monterey	CDHS Volunteer (Jerry Norbn)	2
San Luis Obispo	CDHS Volunteers (Rene and Auburn Atkins, Jim and Nancy Hale)	4
	Morro Bay Natural History Museum	4
	Morro Bay National Estuary Program	4
	Tenera Environmental	3
Santa Barbara	U.C. Santa Barbara Marine Science Institute	5
	California Department of Parks and Recreation	3
	Santa Barbara City College	1
	Santa Barbara Mariculture Company	2
	Catalina Tall Ships Expedition	2
Ventura	Ventura County Environmental Health Department	1
	Catalina Tall Ships Expedition	1
Los Angeles	Los Angeles County Health Department	5
	Los Angeles County Sanitation District	5
	Los Angeles Regional Water Quality Control Board	1
	Catalina Tall Ships Expedition	4
	City of Los Angeles Environmental Monitoring Division	1
Orange	Orange County Sanitation District	8
San Diego	San Diego County Environmental Health Department	2
	CDHS Volunteer (Paul Sims)	1

PHYTOPLANKTON GALLERY



Common diatoms observed in Humboldt Bay throughout April.



A variety of diatoms were observed along the San Luis Obispo coast, including *Pseudo-nitzschia*, the diatom that produces domoic acid.



The Los Angeles coast appeared to be a transition zone in April, with the diatoms being replaced by dinoflagellates.